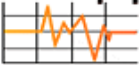


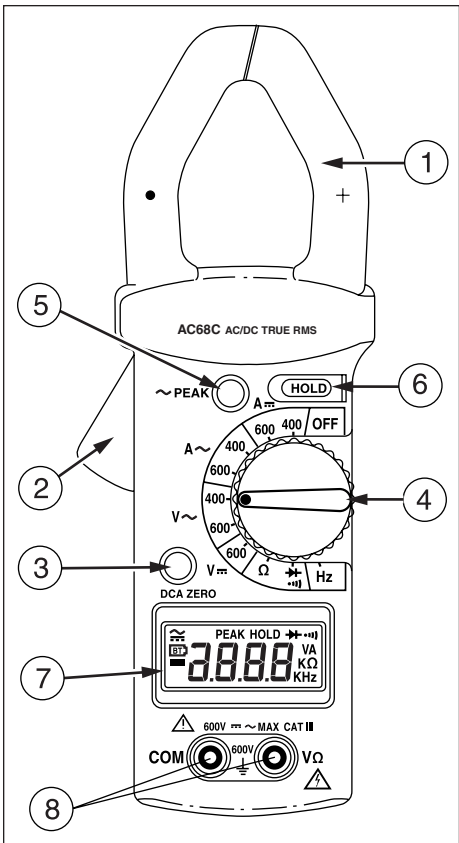


# AC68C

True RMS AC/DC Clamp Multimeter

Users Manual

**Test Equipment** 99 Washington Street  
 **Depot** Melrose, MA 02176  
1-800-517-8431 Fax 781-665-0780  
TestEquipmentDepot.com













# True RMS AC/DC Clamp Multimeter

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## Symbols

	Refer to the manual		Dangerous Voltage
	Double insulated		Battery
	Direct Current		Earth Ground
	Alternating Current		Audible tone
	Complies with EU directives		Underwriters Laboratories, Inc.

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## Introduction

The AC68C is a true rms digital clampmeter that measures both AC and DC current as well as AC and DC voltage, Resistance, Frequency, Continuity and Diode Test.

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## Warnings and Precautions

The AC68C Digital Clampmeter conforms to EN61010-2-032, EN61010-1, CAT III- 600V, class 2 and pollution deg. 2; and UL3111-1. It is recommended for use with local level power distribution, appliances, portable equipment, etc., where only smaller transient overvoltages may occur, and not for primary supply lines, overhead lines, and cable systems.

- **Do not exceed the maximum overload limits per function (see specifications) nor the limits marked on the instrument itself. Never apply more than 600 V dc / ac rms between the test lead and earth ground.**
  - **Inspect the DMM, test leads and accessories before every use. Do not use any damaged part.**
  - **Never ground yourself when taking measurements. Do not touch exposed circuit elements or test probe tips.**
  - **Do not operate the instrument in an explosive atmosphere.**
  - **Exercise extreme caution when: measuring voltage >20 V // current >10 mA // AC power line with inductive loads // AC power line during electrical storms // current, when the fuse blows in a circuit with open circuit voltage >600 V // servicing CRT equipment.**
  - **Always measure current in series with the load – NEVER ACROSS a voltage source. Check fuse first. Never replace a fuse with one of a different rating.**
  - **Remove test leads before opening the case.**
- 

## Unpacking and Inspection

Your shipping carton should include:

Digital clamp meter	1
Carrying case	1
Test lead set (one black, one red)	1
One 9V battery (installed)	1
Manual	1


If any of the items are damaged or missing, return the complete package to the place of purchase for an exchange.

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## Instrument Familiarization (See inside front cover)

**Transformer Jaws:** Designed to pick up the current flowing through the conductor.

**Jaw Opening Lever:** Press lever to open transformer jaws. Release pressure to close the jaws.

**Digital Display:** 3-3/4 digit LCD (max. reading 3999), with decimal point, AC/DC, polarity, unit and low battery (  ) indicators.

**Function/Range Selector:** Selects the desired function and range. Changing position turns instrument back on after Auto-OFF.

**Peak Hold Button:** Toggles on and off. Captures the maximum peak value of a current or voltage surge (motor start-up). "PEAK" is shown on LCD.

**Data Hold Button:** Toggles on and off. Holds reading for all functions and ranges. Always release HOLD before taking a new measurement. "HOLD" is shown on LCD.

**DCA ZERO Button:** Push this button to zero the display before measuring DC current.

**Input Terminals:** Always connect black test lead (negative) to black COM input jack and red test lead to red " $V\Omega$ " input jack for voltage, frequency, resistance, continuity, and diode measurements

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## Measuring Procedures

### General

1. Make sure that the selected function and range are suitable for the measurement to be taken.
2. If the measured current is higher than the selected range for a longer period of time, overheating may occur, compromising the safety and operation of inner circuits.
3. Do not measure currents on high voltage conductors (> 600 V) to avoid risks of discharge and/or incorrect readings.
4. When measuring current, make sure that the test leads are removed from the meter terminals.
5. The most accurate current reading will be obtained by placing the conductor in the center of the jaws (aligned with the centering marks on the transformer jaws).

### DC Current Measurement

1. Set the function/range selector to the appropriate A  $\overline{\text{---}}$  position (400 or 600 A).
2. Press the DCA ZERO button to make sure that the display is zero-reading.
3. Open spring-loaded clamp by pressing the lever on left side of meter.
4. Position clamp around one wire or conductor and release the clamp lever. Make sure that the clamp is entirely closed. The clamp must be positioned around only one conductor. If it is placed around two or more current carrying conductors, the reading is FALSE.
5. Read the displayed value. The direction of the current corresponds to the indication of the pointer on the jaw. Polarity inversion is indicated by a '-' (minus) symbol on the display.

## AC Current Measurement

1. Set the function/range selector to the appropriate A  $\sim$  position (400 or 600 A).
2. Open spring-loaded clamp by pressing the lever on left side of meter.
3. Position clamp around one wire or conductor and release the clamp lever. Make sure that the clamp is entirely closed. The clamp must be positioned around only one conductor. If it is placed around two or more current carrying conductors, the reading is FALSE.
4. Read the displayed value.

## DC and AC Voltage Measurement

### Warning

**The maximum input voltage for DC or AC Volts is 600 Vrms. Do not attempt to take any voltage measurement that exceeds 600 Vrms to avoid electrical shock hazard or damage to the instrument.**

1. Set the function/range selector to the appropriate V  $\equiv$  (600 V) or V  $\sim$  (400 or 600 V) position.
2. Connect the black test lead to the "COM" terminal and the red test lead to the "V $\Omega$ " terminal. Connect probe tips to the circuit and read the value.

## Frequency Measurement

**Note:** Both ammeter and voltmeter can be used for frequency measurement. The clamp-on Ammeter detects the frequency of the current circulating in the cable or bus-bar under test (the current must be greater than 1 A in the 400 A range and greater than 15 A in the 600 A range). The Voltmeter detects the frequency of the voltage applied to the leads.

1. In either set-up (current or voltage measurement), set the function/range switch to the Hz position.
2. Read the frequency value on the display.

## Resistance Measurement

### Warning


**Before taking any in-circuit resistance measurement, remove power from the circuit being tested and discharge all capacitors.**

1. Set the function/range selector to the 4 k $\Omega$  position.
2. Connect the black lead to the COM terminal and red lead to the “V $\Omega$ ” terminal.
3. Connect the test leads to the resistance or circuit to be measured and read the value on the display.


## Continuity Measurement

### Warning

**Before taking any in-circuit continuity measurement, remove power from the circuit being tested and discharge all capacitors.**

1. Set the function/range selector to the  position.
2. Connect the black lead to the COM terminal and red lead to the “V $\Omega$ ” terminal.
3. Connect the test leads to the circuit to be tested. Continuity (resistance  $\leq 40 \Omega$ ) is indicated by a continuous beep tone.

## Diode Test

1. Set the function/range selector to the  position.
2. Connect the black lead to the COM terminal and red lead to the “V $\Omega$ ” terminal.
3. Connect the red test lead to the anode, and the black test lead to the cathode of the diode to be tested.
4. Read the forward voltage value on the display (approx. 0.6 V for a silicon diode or 0.4 V for a germanium diode). An open diode is indicated by “OL”.
5. Reverse test lead connections to the diode to perform a reverse bias test. “OL” indicates a good diode.

**Notes:** “OL” for both reverse and forward bias tests indicates an open diode. A low voltage reading for both bias tests indicates a shorted diode. If the diode is shunted by a resistor of 1000 ohms or less, it must be removed from the circuit before taking the measurement. Bipolar transistor junctions may be tested in the same manner described above as emitter-base and base-collector junctions are diode junctions.

## Peak Hold Measurement

Proceed as for voltage or current measurement (AC or DC).

Before actually taking the measurement, press the PEAK button. “PEAK” is shown on the display. After taking a measurement, the displayed reading is the maximum peak value of a surge in the voltage or current.

## Data Hold

Proceed as for voltage or current measurement (AC or DC). While taking a measurement, press the HOLD button. "HOLD" is shown on the display and the current meter reading is maintained, even after disconnecting the test leads from the circuit or removing the conductor from the clamp. Press HOLD again to deactivate before taking a new measurement.

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## Specifications

### General Specifications

Display: 3-3/4 Digit LCD, max. reading of 3999. Function and unit indication.

Overrange indication: "OL" indicated.

Polarity indication: automatic; positive implied; negative indicated.

Zero adjustment: automatic for all functions and ranges except DC current (Zero adjustment button).


Ranging: manual function and range selection with rotary selector switch. Autoranging for frequency measurement.

Special functions: Data Hold, Peak Hold

Operating principle: dual slope integration

Sampling rate: 2 /sec, nominal.

Maximum voltage between any terminal and earth ground: 600 V

Low Battery Indication:  when battery voltage drops below operating voltage.

Auto Power Off: Approx. 30 minutes after no function change.

Environmental Conditions

Operating temperature: 0 °C to +40 °C, <80 % R.H., non-condensing

Storage temperature: -10 °C to +60 °C, <70 % R.H., battery removed.

Power source: Single 9 V battery (NEDA 1604,1EC 6F22)

Battery life: Alkaline 200 hours.

Maximum jaw opening: 40 mm (1.57 inches)

Pollution degree: Level II

Altitude: < 2000 meters

Size (WxLxH): 76x228x39 mm (3"x9"x1.5")

Weight: 465 gr (incl. battery)

Accessories: Test leads, battery, manual and carrying case.



Safety: Meets EN61010-1 Cat III 600V. EN61010-2-03, UL3111-1, CSA22.2, No 1010-1

EMC: Meets EN55011, EN61000-4-2,4

EMC: This product complies with requirements of the following European Community Directives: 89/336/EEC (Electromagnetic Compatibility) and 73/23/EEC (Low Voltage) as amended by 93/68/EEC (CE Marking). However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit. Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit. Users should exercise care and take appropriate precautions to avoid misleading results when making measurements in the presence of electronic interference.

## Electrical Specifications

*Accuracy is  $\pm$  (%reading + nbr digits) at 23 °C  $\pm$  5 °C, < 80 % R.H. The current error is specified within the largest circle that can be drawn inside the jaw.*

### DC Current

Range	Resolution	Accuracy	Overload Prot.
400 A	0.1 A	$\pm$ (2 %rdg + 5 dgt)	800 A
600 A	1 A	$\pm$ (2 %rdg + 5 dgt)	800 A

### AC Current, Trms

Range	Resolution	Accuracy	Overload Prot.	Freq. Response
400 A	0.1 A	$\pm$ (2 %rdg + 5 dgt)	800 A	40-450 Hz
600 A	1 A	$\pm$ (2 %rdg + 5 dgt)	800 A	40-450 Hz

Conversion: Ac coupled Trms

Crest Factor (Non-Sinusoidal) (50 – 60 Hz)

1 – 3:  $\pm$  0.5 %      3 – 5:  $\pm$  3 %      5 – 7:  $\pm$  6 %

### DC Voltage

Range	Resolution	Accuracy	Input Imped.	Overload Prot.
600 V	1 V	$\pm$ (0.75 %rdg + 2 dgt)	1 M $\Omega$	660 Vrms

**AC Voltage Trms** – Frequency response: 40-450 Hz

Range	Resolution	Accuracy	Input Imped.	Overload Prot.
400 V	0.1 V	$\pm$ (1.2 %rdg + 10 dgt)	1 M $\Omega$	660 Vrms
600 V	1 V	$\pm$ (1.2 %rdg + 10 dgt)	1 M $\Omega$	660 Vrms

Conversion: Ac coupled Trms

Crest Factor (Non-Sinusoidal) (50 – 60 Hz)

1 – 3:  $\pm$  0.5 %      3 – 5:  $\pm$  3 %      5 – 7:  $\pm$  6 %

**Frequency (Hz)** – Autoranging for current and voltage

Range	Resolution	Accuracy	Sensitivity	Overload Prot.
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4k Hz	1 Hz $\pm$ (0.5 %rdg + 5 dgt)	1 V / 5 A	660 Vrms /800 A
20 kHz*	0.01 Hz $\pm$ (0.5 %rdg + 5 dgt)	5 V	660 Vrms

\* - Voltage input only

### Resistance

Range	Resolution	Accuracy	Open circ.volts	Overload Prot.
4 k $\Omega$	1 $\Omega$ $\pm$ (1 %rdg + 5 dgt)	$\leq$ 0.5 VDC		660 Vrms

### Diode Test

Range	Resolution	Accuracy	Open circ.volts	Overload Prot.
$\rightarrow$	0.001 V $\pm$ (1 %rdg + 2 dgt)	3.0 VDC max		660 Vrms

Max short circuit current: 0.8 mA (typical)

### Audible Continuity Test

Range	Accuracy	Open circ.volts	Overload Prot.
40 $\Omega$	$\leq$ 0.5 V	3.0 VDC max	660 Vrms

Max short circuit current: 0.8 mA (typical)

### Peak Hold Measurement, AC Voltage (50 Hz – 60 Hz)

Range	Resolution	Accuracy	Input Imped.	Overload Prot.
400 V	0.1 V	$\pm$ (1.5 %rdg +10 dgt)	1 M $\Omega$	660 Vrms
600 V	1 V	$\pm$ (1.5 %rdg +10 dgt)	1 M $\Omega$	660 Vrms

### Peak Hold Measurement, AC Current (50 Hz – 60 Hz)

Range	Resolution	Accuracy	Overload Prot.
400 A	0.1 A	$\pm$ (2 %rdg +10 dgt)	800 A
600 A	1 A	$\pm$ (2 %rdg +10 dgt)	800 A

## Troubleshooting

In case of malfunction during the operation of the meter, the following steps should be performed in order to isolate the cause of the problem:


1. Check the battery.
2. Review the operating instructions for possible mistakes in operating procedure.
3. Check the clamp against a known current source. Use the voltage function to measure a known voltage (AC and DC).
4. Check the test leads for continuity (voltage and resistance). Except for the replacement of the battery, repair of the clamp should be performed only by a Factory Authorized Service Center or by other qualified instrument service personnel. Front panel and case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and let dry completely before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.

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## Battery Replacement



**To avoid electrical shock remove the test leads from both the meter and the test circuit before accessing the battery.**

1. Replace the battery as soon as the low-battery symbol  is displayed.
2. Set the function/range switch to OFF and remove the test leads.
3. Position the meter face down. Remove the screw and lift off the back cover.
4. Replace the battery with an equivalent 9 V battery.
5. Reassemble the instrument.